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Higher-Order Differencing Schemes for Modeling Intense Laser-Plasma Interactions G. M. TARKENTON, Insitute for Advanced Physics, B. A. SHADWICK, Center for Beam Physics, LBNL and Institute for Advanced Physics, C. B. SCHROEDER, Center for Beam Physics, LBNL   Traditionally numerical solutions of PDEs use methods that are second-order in both space and time. This is both for historic reasons and because conservative differencing schemes have important properities especially for hydrodynamic modeling. With the aid of modern symbolic algebraic methods, designing higher-order, stable methods is practical. Higher-order methods are attractive as they offer the promise of increased accuracy compared to second-order methods for a given set of grid parameters. We discuss the stability, dispersion, and computation performance of various higher-order methods. We find that the use of higher-order methods for solving both the full-fuild and envelope models yield and significant performance gains (from reduced grid sizes and a larger stability basin) over the corresponding second-order solvers.

☐ Prefer Oral Session
☒ Prefer Poster Session

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